

Hedging Strategies Using Futures

Chapter 3

Long & Short Hedges

- A long futures hedge is appropriate when you know you will purchase an asset in the future and want to lock in the price
- A short futures hedge is appropriate when you know you will sell an asset in the future and want to lock in the price

Arguments in Favor of Hedging

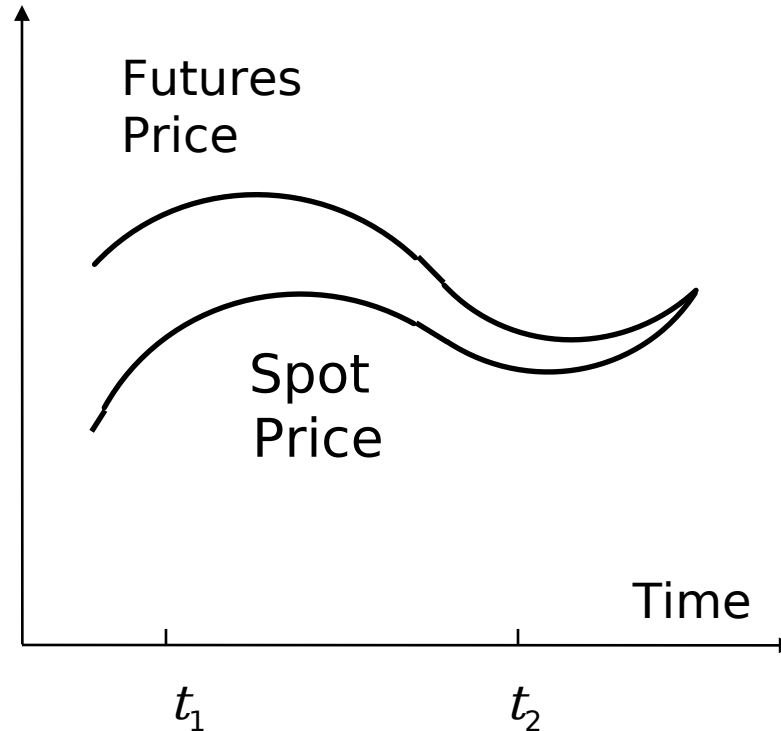
Companies should focus on the main business they are in and take steps to minimize risks arising from interest rates, exchange rates, and other market variables

Arguments against Hedging

- Shareholders are usually well diversified and can make their own hedging decisions
- It may increase risk to hedge when competitors do not
- Explaining a situation where there is a loss on the hedge and a gain on the underlying can be difficult

Convergence of Futures to Spot

(Hedge initiated at time t_1 and closed out at time t_2)



Basis Risk

- Basis is the difference between the spot and futures price
- Basis risk arises because of the uncertainty about the basis when the hedge is closed out

Long Hedge

- We define

F_1 : Initial Futures Price

F_2 : Final Futures Price

S_2 : Final Asset Price

- If you hedge the future purchase of an asset by entering into a long futures contract then

$$\text{Cost of Asset} = S_2 - (F_2 - F_1) = F_1 + \text{Basis}$$

Short Hedge

- Again we define
 - F_1 : Initial Futures Price
 - F_2 : Final Futures Price
 - S_2 : Final Asset Price
- If you hedge the future sale of an asset by entering into a short futures contract then

$$\text{Price Realized} = S_2 + (F_1 - F_2) = F_1 + \text{Basis}$$

Choice of Contract

- Choose a delivery month that is as close as possible to, but later than, the end of the life of the hedge
- When there is no futures contract on the asset being hedged, choose the contract whose futures price is most highly correlated with the asset price. This is known as cross hedging.

Optimal Hedge Ratio (page 55)

Proportion of the exposure that should optimally be hedged is

where
$$\rho \frac{\sigma_S}{\sigma_F}$$

σ_S is the standard deviation of ΔS , the change in the spot price during the hedging period,
 σ_F is the standard deviation of ΔF , the change in the futures price during the hedging period
 ρ is the coefficient of correlation between ΔS and ΔF .

Tailing the Hedge

- Two way of determining the number of contracts to use for hedging are
 - Compare the exposure to be hedged with the value of the assets underlying one futures contract
 - Compare the exposure to be hedged with the value of one futures contract (=futures price time size of futures contract)
- The second approach incorporates an adjustment for the daily settlement of futures

Hedging Using Index Futures

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To hedge the risk in a portfolio the number of contracts that should be shorted is

$$\beta \frac{P}{F}$$

where P is the value of the portfolio, β is its beta, and F is the value of one futures contract

Example

S&P 500 futures price is 1,000

Value of Portfolio is \$5 million

Beta of portfolio is 1.5

What position in futures contracts on the S&P 500 is necessary to hedge the portfolio?

Changing Beta

- What position is necessary to reduce the beta of the portfolio to 0.75?
- What position is necessary to increase the beta of the portfolio to 2.0?

Hedging Price of an Individual Stock

- Similar to hedging a portfolio
- Does not work as well because only the systematic risk is hedged
- The unsystematic risk that is unique to the stock is not hedged

Why Hedge Equity Returns

- May want to be out of the market for a while. Hedging avoids the costs of selling and repurchasing the portfolio
- Suppose stocks in your portfolio have an average beta of 1.0, but you feel they have been chosen well and will outperform the market in both good and bad times. Hedging ensures that the return you earn is the risk-free return plus the excess return of your portfolio over the market.

Rolling The Hedge Forward

(page 64-65)

- We can use a series of futures contracts to increase the life of a hedge
- Each time we switch from one futures contract to another we incur a type of basis risk